

TWMA Dales Industrial Estate, Peterhead Site Review and Site Investigation Design for PPC/A/1000175



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CONTROL SHEET

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Contents

1	Introduction	1
1.1	Background	1
1.2	Scope of Report	1
1.3	Report Usage	2
2	Environmental Setting	3
2.1	Geology	3
2.2	Hydrogeology	3
2.3	Hydrology	4
2.4	Soil Type	4
2.5	Habitat and Land Use	4
3	Update on Site Operation and Condition	5
3.1	Changes at the Site since 2014	5
3.2	Incidents	5
3.3	Issues Identified	5
4	Summary of Operational Installation Design	7
4.1	Operations	7
4.2	Control Measures	8
5	Conceptual Site Model (CSM)	13
5.1	Sources	13
5.2	Pathways	16
5.3	Receptors	17
6	Proposed Intrusive Investigation	18
6.1	Objectives	18
6.2	Investigation Overview	18
6.3	Investigation Locations and Depths	18
6.4	Soil Sampling	19
6.5	Laboratory Analysis of Soils	19
6.6	Borehole Monitoring and Groundwater Sampling	20
6.7	Laboratory Analysis of Groundwater	20
6.8	Reporting	20

Appendices

- A Figures
- B Recorded Environmental Incidents

Figures

Site Layout, Drawing PHD-LY-00-00-3108, dated 31 March 2011
Site Layout, Drawing ENG-DWG-9481, dated 4 October 2023
379860-GIS001 Proposed Site Investigation Plan – relative to current site layout
379860-GIS002 Proposed Site Investigation Plan – relative to 2014 site layout

Tables

Table 4-1: Site Pollution Prevention Measures	9
Table 5-1: Relevant Hazardous Substances	14
Table 6-1: Rationale for Borehole Locations.....	18
Table 6-2: Relevant Hazardous Substances to be Analysed in Soil.....	20
Table 6-3: Relevant Hazardous Substances to be Analysed in Groundwater.....	20

1 INTRODUCTION

1.1 Background

EnviroCentre was commissioned to undertake a site review and site investigation design for the Total Waste Management Alliance Plc (TWMA) facility at Unit 12, Dales Industrial Estate, Peterhead, Aberdeenshire AB42 3JR. The site operates as a hazardous waste treatment facility and waste transfer station under SEPA permit PPC/A/1000175.

The purpose of the review and site investigation design is to inform the production of a revised Site Condition and Baseline report following SEPA-initiated PPC permit variation¹ in 2023 to incorporate Waste Treatment BAT/Bref. This is to be prepared in accordance with SEPA's PPC Technical Guidance Note 2 (Site Reports), dated 6 December 2013, Guidance No. IED-TG-02.

Site investigation was last undertaken in 2014 in relation to intended substantial variation of the permit to include additional land area, with associated reporting to update on the initial site condition. Ultimately, the variation was not submitted and the site boundary remains as previous. Original permit application site investigations were carried out in 2005 and 2007. The current investigation is intended to follow up on the 2014 report², using this as a baseline. Previous investigations included sampling and analysis of soil and groundwater.

Under VAR01 of the PPC permit, TWMA is also required to undertake periodic soil and groundwater monitoring. The current investigation aims to install boreholes for subsequent monitoring of groundwater. The overall purpose of soil and groundwater monitoring, as specified in the Industrial Emissions Directive (IED), is to detect possible soil and groundwater pollution at an early stage and, therefore, to take appropriate corrective measure before the pollution spreads.

1.2 Scope of Report

EnviroCentre undertook a site walkover in August 2024 and has also based this report on review of the 2014 Site Report and other documents provided by Igne/ TWMA.

Details of the site history and site setting can be found within the 2014 report.

The contents of the current report include the following:

- Identification of changes at the site since 2014;
- Potential for emissions to soil or groundwater to have occurred from the installation;
- A Conceptual Site Model for the site;
- Identification and justification of sampling/ monitoring locations;
- Rationale and specification of soil and groundwater sampling;
- Determination of the potential contaminant testing schedule.

¹ VAR01, dated 23rd May 2023

² TWMA Limited, Permit Variation Application Site Report Update, Dales Industrial Estate, Peterhead, July 2014

1.3 Report Usage

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2 ENVIRONMENTAL SETTING

2.1 Geology

Geology information is mainly sourced from the 2014 Site Report.

2.1.1 Artificial Deposits

It is likely that the development of the Dales Industrial Estate involved a degree of earthworks that is represented by a shallow layer of re-worked clay rich glacial drift that has been identified as Made Ground beneath most of the site area (see Section 2.4).

2.1.2 Superficial Deposits

Maps show superficial deposits beneath the site and the surrounding area comprising glacial till from the most recent Devensian glacial period. Till is predominantly unsorted and unstratified drift and generally unconsolidated (loose), consisting of a heterogeneous mixture of clay, silt, sand and gravel.

Previous intrusive investigation at the site has proven that the drift deposits range between 5m and 10m in thickness and contain significant layers of very clayey sediment and water-saturated running sands. Individual layers do not appear to persist between investigation locations within the site boundary, indicating significant local heterogeneity within the superficial deposits at a site scale (given as 0-5m vertically and 10-100m laterally).

2.1.3 Bedrock

The solid geology of the site and surrounding area is mapped as the Peterhead Pluton, a coarse-grained granite rock formation. Typically, granite bedrock is highly fractured and often exhibits a weathered layer close to the ground surface or interface with superficial deposits.

2.2 Hydrogeology

The superficial deposits overlying the granite have been demonstrated to contain significant groundwater by each of the site investigations conducted within the site area.

Available groundwater level measurements show varying depths of water strikes during drilling between approximately 2.5m and 5.0m bgl, with subsequent resting water levels (RWLs) similar. Previous measurement of RWLs in surveyed borehole locations was considered too variable to allow an estimation of the general groundwater flow direction across the site area. It is, however, anticipated that groundwater flow will be broadly in an easterly direction towards the North Sea. Groundwater levels may be affected by extensive impermeable cover (reducing local infiltration) and installed subsurface drainage.

The bedrock aquifer comprises the Peterhead groundwater body (ID: 150630), which has a total area of 185.8km². As with all identified groundwater bodies in Scotland, SEPA has defined this as a Drinking Water Protected Area. Water quality in the aquifer was assessed as Good in 2020.³ The

³ [Water Environment Hub \(sepa.org.uk\)](https://www.sepa.org.uk)

bedrock is classified by the British Geological Survey (BGS) as a Class 2C low productivity aquifer, with small amounts of groundwater in the near-surface weathered zone and fractures. Flow is virtually all through fractures and other discontinuities.⁴

The BGS groundwater vulnerability classification at the site is estimated to be class 3: “vulnerable to some pollutants; many others significantly attenuated”. The thickness and relatively low permeability of the superficial deposits are expected to reduce the potential for contaminants to migrate downwards to the water table of the aquifer which lies within these deposits. The superficial deposits will also provide protection to the underlying bedrock aquifer.

2.3 Hydrology

There is a small burn located 400m south of the site. There are no other surface water features within the locality of the site and all current site surface drainage is directed to the installed artificial drainage system. The site is therefore considered effectively isolated from the local surface water environment.

2.4 Soil Type

No topsoil or subsoil is known or anticipated to be present on the site.

Previous investigation identified a surface cover of concrete (approximately 0.25m thickness) underlain in places by shallow made ground (maximum thickness approximately 0.5m) of aggregate and/or reworked superficial deposits.

2.5 Habitat and Land Use

The site comprises an industrial premises with complete concrete cover.

The site is surrounded by other industrial premises within Dales Industrial Estate. These largely comprise presumed warehousing and laydown yards for the offshore oil and gas industries.

The Buchan Ness to Collieston Coast Special Protection Area (SPA) is located approximately 1.6km south-east of the site. There are no other relevant conservation designations within 2km of the site.⁵

⁴ [Map | Scotland's environment web](#)

⁵ [SiteLink - Map Search \(nature.scot\)](#)

3 UPDATE ON SITE OPERATION AND CONDITION

3.1 Changes at the Site since 2014

This section provides an update to Section 3.2 of the 2014 report.

The site has undergone considerable upgrading and alteration since 2014, with erection of new site buildings and site rearrangement undertaken in approximately 2016. These changes have resulted in waste operations being confined to the west side of the site, while the east contains site offices, maintenance and fabrication facilities. Site plans as current (dated 2023) and as in 2014 (dated 2011) are included in Appendix A. The following specific changes have been made:

- A new bunded area was constructed at the north-west of the site in 2014/15. The bund comprises the Slops Tank Farm and includes the Slops Processing Area.
- The extent of the tank bund at the south-west has been altered and the number of vertical storage tanks for drill cuttings reduced to four.
- The former Fairy Hillock area on the south of the site was fully concreted in approximately 2018. Up until this time, only the northern part of the land from which this mound had been removed was under concrete, with the remainder as rough ground. Thermomechanical treatment of oil-based mud cuttings (OBMC) and management of recovered powder is now undertaken on part of this area.
- The former office building at the north of the site was replaced with a laboratory.
- On the north-east of the site, the former drill cuttings process building is now a fabrication workshop, the tank bund on its west side has been removed, a new office building has been erected at its east side in the former location of the Slops Tank Farm, and the former yard area at its north is now largely car parking.
- At the east of the site, the former tank bund is used for fuels/ oils/ coolants. Slops processing activities are no longer undertaken in this area, with welfare cabins now present.
- The former special waste storage shed at the south-east of the site is now a maintenance workshop. A new concrete floor was laid on top of the existing concrete.
- A tank farm at the south of the site has been removed.

3.2 Incidents

Incident records contained within the 2014 Site Report Update show the occurrence of numerous leaks and spills between (and prior to) PPC permit issue in 2006 and 2014. Details of incidents since 2014 are provided in Appendix B. All of these relate to oily wastes/ materials, hydraulic fluid or diesel, with recorded quantities ranging from <10 litres to 300 litres.

In addition, a leak from the diesel tank bund south of the workshop building in approximately 2019 caused contaminated water to enter the adjacent yard operated by Peterson. The bund was repaired and monitoring boreholes were installed in the Peterson yard. These boreholes have since been decommissioned.

3.3 Issues Identified

The following are included in the July 2014 Site Report Update:

- The condition of the concrete (and associated joints / slab edges) was variable and containment bunding along the edges of concrete areas was not universally effective (oily contamination was observed at one location, leaking into unsealed ground close to the cuttings treatment plant, which is believed to have been east of its current location).
- The integrity of the site drainage system was also reported to be compromised in places (locations not specified), with leakages to the subsurface likely to be occurring. It was noted that drainage repairs and follow-up surveying were imminent at the time of writing.

Issues noted during walkover of the site in August 2024 are included in Section 5.2.

4 SUMMARY OF OPERATIONAL INSTALLATION DESIGN

4.1 Operations

The site is a permitted facility for the treatment of hazardous wastes generated by the offshore oil & gas industry, and is also a transfer station for special wastes. The site operates a thermo-mechanical treatment process for OBMC, the RotoMill™, specifically designed to flash evaporate the fluid phase present in drill cuttings, recovering oil and water; the remaining solid phase is discharged as a fine powder. A related physico-thermal treatment process is utilised for the treatment of low solids, high water-content oil-contaminated liquids (oily slops). These two processes are complementary, in that residue from gravity separation/ settlement of the recovered oil and water from the RotoMill process is transferred to the slops process, and solids separated from the slops by centrifugation are transferred to the RotoMill process.

As a result of upgrading and alteration which started in approximately 2014, waste operations are confined to the western two-thirds of the site, while the eastern third contains site offices, maintenance and fabrication facilities.

At the north-west of the site is the Slops Tank Farm which houses a total of 17 vertical storage tanks with individual capacities of 47-115m³ for oily slops, recovered oils and recovered water. This also includes the Slops Processing Area and recovered water treatment (DAF plant).

At the south-west, another bund houses four concrete bulk tanks for OBMC, each with 385m³ capacity, and a quarantine area for temporary storage of non-compliant wastes.

The area between the two bunds is used for storage and tipping of skips/ bins of OBMC and slops, and for onward transfer of OBMC for processing. There is also storage of IBCs and drums of purchased raw materials: the IBCs contain flocculants/ polymers for use in the slops tank farm and DAF plant, and the drums contain oil, lubricant and coolants.

A Terex with clam shell scoop and extendable arm is used to transfer cuttings from the four cuttings tanks to the Yard CST. A shaker removes large debris (rocks etc), then the cuttings are transferred to the RotoMill unit via a line running east within a concrete-lined trench approximately 1m deep. The OBMC treatment process is located in the centre of the south of the site. From the RotoMill, recovered oil, recovered water and recovered slops all run in the opposite direction (west then north) in the same trench to the Slops Tank Farm.

From the OBMC process, a blowline also runs to a powder silo and an adjacent powder laydown area, carrying recovered powder from the process.

A washbay used for skips/ bins is present near the centre of the site and is surrounded by skip laydown areas.

A laboratory for the analysis of waste, recovered oils and effluent is at the centre north of the site.

There is storage of fuels, oil and coolants in a bund at the east of the site, and a 40m³ horizontal steel diesel tank is present in a metal-walled bund at the south-east boundary of the site. Two mobile banded diesel tanks are also used on the site.

Buildings present on the east of the site include fabrication and maintenance workshops.

There are foul and surface water sewerage systems draining to the north-east on the active yard areas of the site. At present, the valve on the surface water interceptor has been isolated, although it is intended to reinstate flow once initial phases of site improvements are complete.

4.2 Control Measures

The full site area is surfaced with concrete. This is of varying ages, with concrete laid more recently on the former Fairy Hillock area of the south of the site which is utilised for processing of OBMC and management of recovered powder. A new concrete floor was also laid on top of the existing concrete within the current maintenance shed.

Hardstanding inside the site typically falls to drains or sumps, such that these collect all surface water run-off from working areas of the site.

All bulk storage tanks for OBMC, slops, oil and recovered water, along with their fill-points, are located within bunds. The Slops Tank Farm bund at the north-west was constructed to required standards in 2014/15, including a poured concrete wall with no service penetrations. Other bunds are older and of varying construction (both the diesel tank bund at the south-east and the bund at the east of the site have corrugated/ sheet metal walls). A wall extends from the tank farm bund along the western boundary of the site, behind the decanter and slops control room, containing potential run-off.

Lines carrying OBMC and recovered materials to and from the RotoMill run within a concrete-lined trench, over which is placed metal plating – this allows constant access to the lines for maintenance *etc.* Therefore, whilst the lines are “sunk” to allow movement of vehicles over the top, they are not underground as such and are accessible and in easily observable condition.

Pollution prevention measures relevant for installation activities are summarised in Table 4-1.

Table 4-1: Site Pollution Prevention Measures

Relevant Activity	Primary Containment	Secondary Containment	Tertiary Containment
OBMC and Slops			
OBMC and slops receipt and storage - skips/ bins	Skips/ bins are compliant to British standards and LOLER regulations. All bins used in transport of drill cuttings are certified and in test. Slings and shackles are tested every 6 months.	Skips/ bins are stored on impermeable hardstanding. The area is not bunded and has no containment kerb as this would prevent forklift access.	Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
OBMC transfer to and from storage tanks	Terex scoop provides primary containment.	Transfer takes place over impermeable hardstanding. The area containing skips/ bins and the Yard CST is not bunded and has no containment kerb as this would prevent forklift access. A wall prevents run-off to the west.	
OBMC storage - tanks	Above-ground tanks. Tanks are inspected daily during tank volume measurement.	All OBMC storage tanks contained within concrete bunded area. Bunds are inspected as part of daily site inspection.	
Slops transfer to storage tanks	Tanker/ skips/ bins and decanter provide primary containment.	Transfer takes place over impermeable hardstanding. The area containing skips/ bins is not bunded and has no containment kerb as this would prevent forklift access. A wall prevents run-off to the west.	
Slops storage - tanks	Above-ground tanks. Tanks are inspected daily during tank volume measurement.	All slops storage tanks contained within Slops Tank Farm bund, constructed to required standards in 2014/15, including a poured concrete wall with no service penetrations. Bunds are inspected as part of daily site inspection.	
OBMC transfer to RotoMill	Permanent pump line. Prevention against blocking provided by regular purging of line, pressure testing and automatic shutdown feature in event of blockage.	Pump line is contained within concrete-lined trench which can be readily accessed and viewed.	
OBMC processing	Vessels and pipework provide primary containment.	None currently.	
Slops transfer and processing	Vessels and pipework provide primary containment.	Slops processing is contained within Slops Tank Farm bund, constructed to	

Relevant Activity	Primary Containment	Secondary Containment	Tertiary Containment
		required standards in 2014/15, including a poured concrete wall with no service penetrations. Bunds are inspected as part of daily site inspection. Pump line from OBMC process is contained within concrete-lined trench which can be readily accessed and viewed.	
Recovered Oil/ PFO			
Transfer to bulk storage	Permanent pump lines. Prevention against blocking provided by regular purging of lines and planned maintenance schedule.	Pump line from OBMC process is contained within concrete-lined trench which can be readily accessed and viewed. Transfer from slops process is within Slops Tank Farm bund.	Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
Storage	Above-ground tanks. Tanks are inspected daily during tank volume measurement.	All oil storage tanks contained within Slops Tank Farm bund, constructed to required standards in 2014/15, including a poured concrete wall with no service penetrations. Bunds are inspected as part of daily site inspection.	
Transfer off site	Pump line/tanker. Transfer of recovered oil to tanker supervised by site personnel.	Tanker loading takes place on impermeable hard standing.	Drain cover mats placed over drains during transfer. Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
Recovered Powder			
Transfer to Bulk storage	4" Steel Blow line. Safety valve pressure controllers fitted to blow line to regulate pressure. All pipe work is inspected on daily basis.	Impermeable hard standing.	None required for a solid product. All yard staff trained in spill response procedures.
Storage	50 tonne storage silo. Safety valve pressure controllers fitted to silo to regulate pressure.		

Relevant Activity	Primary Containment	Secondary Containment	Tertiary Containment
Removal offsite	Transport containers.		
Recovered Water			
Transfer to bulk storage	Permanent pump lines. Prevention against blocking provided by regular purging of lines and planned maintenance schedule.	Pump line from OBMC process is contained within concrete-lined trench which can be readily accessed and viewed. Transfer from slops process is within Slops Tank Farm bund.	Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
Storage	Above-ground tanks. Tanks are inspected daily during tank volume measurement.	Recovered water tanks contained within Slops Tank Farm bund, constructed to required standards in 2014/15, including a poured concrete wall with no service penetrations. Bunds are inspected as part of daily site inspection.	All yard staff trained in spill response procedures. Water is discharged off-site via authorised Scottish Water discharge consent.
Diesel/ Gas Oil			
Fuel delivery	Road tanker	Road tanker is located on impermeable hard standing during transfer.	During deliveries of fuel, all drains are covered with spill protection drain cover mats. Fuel transfer is operated under a permit to work system. Specialised transfer lines/ valves with automatic shut-off mechanism are used during transfer. Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
Fuel storage - steel tank	Above-ground steel tank. Daily visual inspection for leaks or signs of excessive corrosion/ damage.	Tank contained within metal-walled bund. Bunds are inspected on a daily basis as part of the daily site inspection.	Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
Fuel storage - bowsers	Tanks of modern construction complying with Oil Storage Regulations.	Tanks are integrally-bunded.	

Relevant Activity	Primary Containment	Secondary Containment	Tertiary Containment
Fuel transfers/ refuelling	Pumping/ fuel lines. Prevention against blocking provided by regular purging of line and/or pressure testing.	Impermeable hard standing.	Drain cover mats for surface water drains to prevent any spillages entering surface water drainage system. Oil interceptor and shut-off key that can be shut off in event of any spillage to prevent oil entering drainage. Interceptor is checked as part of daily site inspection. All yard staff trained in spill response procedures.
Maintenance Chemicals			
Storage and transfer	Supplied in drums/ containers	Some storage in bund on east of site or in enclosed buildings. Impermeable hard surfacing elsewhere. A wall prevents run-off to the west from storage by tank farms.	Interceptor shut off to prevent any spillage escaping site. Drain cover mats for surface water drains to prevent any spillages entering surface water drainage system. All yard staff trained in spill response procedures.

5 CONCEPTUAL SITE MODEL (CSM)

5.1 Sources

5.1.1 On-site

Permitted wastes for the on-site treatment processes comprise a mixture of cuttings, mud and other drilling residues. Oily wastes are expected to contain assorted hydrocarbon components including polycyclic aromatic hydrocarbons (PAHs) and BTEX, other volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs); heavy metals such as barium, zinc and chromium; sulphate and chloride.

Recovered powder from drill cuttings processing is stored near to the process on the south of the site. This contains oil, mud and salt residues and, therefore, similar RHS to the incoming wastes.

Diesel and recovered oil are used to fuel waste treatment processes and mobile plant at the site.

A variety of maintenance chemicals are stored and used at the site. These include drums of fuels, oils and coolants stored in the bund at the east of the site and on impermeable surfacing on the west of the site, where there are also IBCs of flocculants/ polymers for use in the slops tank farm and DAF plant. Other chemicals are typically used in relatively small quantities and stored inside the buildings. No significant changes in chemicals used are known since 2014.

The PPC permit allows almost all categories of waste to be accepted at the transfer station. Powders such as cement are currently accepted for transfer, although typically these do not physically reach the site but are delivered directly to the destination facility. If they do reach the site, they are stored with the cuttings skips until collected. The waste transfer function is also understood to have been used to only a limited extent in the past, with the company's East Tullos (Aberdeen) site used in preference. Small quantities of assorted wastes from offshore were received at the site and stored temporarily within the shed at the south-east pending transport to East Tullos. Wastes were in sealed containers, with no sorting, bulking or decanting known to have occurred.

During the site walkover in August 2024, no obvious evidence of potential contaminant presence was observed outside of primary or secondary containment.

Aside from the permitted activities on the site, the fabrication shed has an asbestos cement roof, as do industrial buildings immediately east of the site. These appear to be in good condition, with no obvious damage or associated fragments observed during the walkover.

Potential sources are summarised in Table 5-1.

Table 5-1: Relevant Hazardous Substances

Substance	State	Expected RHS	CAS No.	Hazard Substance under Stage 2	Environmental Fate & Behaviour	Potential Pollution Risk	Maximum Quantity	Storage Arrangements	Delivery, storage & use details	Comments/ Chemical of Concern
OBMC	P	OBMC expected to contain base oil (petroleum hydrocarbons) in C10-C20 range and possibly additional TPH arising from well. PAH content. Additives expected to include barite (barium sulphate), with impurities including cadmium, chromium, copper, mercury, lead and zinc. Trace metals also expected in cuttings (sedimentary rock fragments).	N/A	Y	Free oil component expected to float on water (LNAPL). Solid component expected to settle and have low mobility. Barite and associated metal impurities expected to be predominantly as insoluble mineralised sulphide salts with limited environmental mobility and low toxicity.	Y	2,040m ³	Temporary storage in incoming skips/ bins on west of site. Maximum 500, each c1m ³ . Bulk storage in 4 tanks in bund at south-west of site.	Delivery in skips/ bins.	
Slops	L	As OBMC	N/A	Y	As OBMC	Y	528,000 litres	Temporary storage in incoming skips/ bins on west of site. Bulk storage in 6 tanks in Slops Tank Farm.	Delivery by tanker or in skips/ bins.	
Recovered oil/ PFO	L	Similar composition to diesel but lower calorific value and higher particulates.	N/A	Y	Floats on water (LNAPL). Organic content inherently biodegradable but contains components that may bioaccumulate/ bioconcentrate.	Y	611,000 litres	Bulk storage in 8 tanks in Slops Tank Farm.	By-product of OBMC/ slops process. Used to fuel process, with surplus tankered off-site.	
Recovered water	L	As OBMC and slops but all RHS expected to be only in low concentrations. Elevated COD and suspended solids.	N/A	N		Negligible	112,000 litres	Bulk storage in 3 tanks in Slops Tank Farm.	By-product of OBMC process. Treated by DAF plant then disposed to sewer via authorised Scottish Water discharge consent.	
Powder	S	Contains oil, mud and salt residues, but organics expected to be only in low concentrations.	N/A	N	Stable, expected to have no potential for bioaccumulation and does not biodegrade.	Negligible	Permitted max. = 300 tonnes	Powder silo and laydown area for sacks on centre south of site.	By-product of OBMC process. Taken off-site by	

Substance	State	Expected RHS	CAS No.	Hazard Substance under Stage 2	Environmental Fate & Behaviour	Potential Pollution Risk	Maximum Quantity	Storage Arrangements	Delivery, storage & use details	Comments/ Chemical of Concern
		Classified as non-hazardous under WM2.							lorry for disposal.	
Diesel/ Gas oil	L	TPH, PAHs	68334-30-5	Y	Floats on water (LNAPL). Inherently biodegradable but contains components that may bioaccumulate/ bioconcentrate.	Y	Permitted max. = 130m ³	40m ³ steel tank in dedicated bund at south-east site boundary. Two mobile bunded tanks, each 6m ³ .	Delivery by tanker. Used to fuel treatment processes and mobile plant.	
Lubricating, hydraulic and other oils	L	TPH, VOCs, SVOCs		Y	Floats on water (LNAPL). Inherently biodegradable but contains components that may bioaccumulate/ bioconcentrate.	Y	Permitted max. = 4,000 litres	Drummed storage, some within bund on east of site.	Containerised delivery by lorry. Used within plant and equipment.	
Antifreeze & coolant	L	Glycols		Y	Expected to be readily biodegradable.	Y	Permitted max. = 5,000 litres	Drummed storage, some within bund on east of site.	Containerised delivery by lorry. Used within plant engines.	Relatively low quantities (both total and per container) and low persistence make these a minor potential source for the site.
Flocculants / polymers (Polyacrylamide polymer with adipic acid added)	S	None		N	Readily degrades.	Negligible	<10,000 litres	IBC storage on west of site.	Containerised delivery by lorry. Used in the Slops Tank farm and DAF plant.	

5.1.2 Off-site

The site is surrounded by other industrial premises within Dales Industrial Estate. These largely comprise presumed warehousing and laydown yards for the offshore oil and gas industries and are unlikely to be a significant source of contamination for the site.

5.2 Pathways

The following potential incidents may lead to the release of RHS to the ground surface outside of primary and secondary containment at the site:

- Failure of containment;
- Spillage during transfer or handling;
- Leakage/ spillage during treatment process; and
- Washing of contaminated skips/ bins and other plant/ equipment.

Unfamiliarity of staff with plant and vandalism are additional potential factors which may lead to releases.

Where visible, the current bunds at the north-west (Slops Tank Farm) and east of the site appear to be in good condition. During the walkover in 2024, older sections of the bund wall of the tank farm at the south-west were noted to be in relatively poor condition, including the presence of a vertical crack on the south wall and an exposed joint on the north-west wall. The bund for the diesel tank at the south of the site is known to have leaked in 2019, resulting in contaminated water entering the adjacent yard off-site, but was subsequently repaired.

Process pipe-work is all hard-piped, fixed in position and is regularly maintained. Flexible hoses present more of a risk.

A number of incidents involving released of oily wastes/ materials, hydraulic oil or diesel have been recorded since 2014. While some of these were within bunds or were readily cleaned-up, others were of relatively large (or unspecified) quantities onto yard areas at the site. Where the location of spills is specified, as would be expected, these include the main areas in which oily wastes are handled, specifically the vicinities of tank bunds and the RotoMill area.

The following are identified as potential routes which may lead to the entry of RHS into the ground at the site:

- Joints or damage to concrete surfacing;
- Leakage from underground feed lines; and
- Leaking underground sumps and drainpipes.

Although none is present within the site boundary, direct entry into ground without impermeable surfacing is a potential pathway from run-off at the site boundaries, where no barrier is present. In particular, a tapering vegetated strip is present at the south of the OBMC tank bund.

A walkover of the site in August 2024 noted that, in general, concrete surfacing of yard area on the north-west part of the site was older and had more joints and damage than newer concrete further south. The following specific issues were observed (manholes are identified by reference to the site drain survey):

- The washbay area concrete was in poor condition, with extensive fracturing and possible unsealed joints, despite some repairs reported to have been undertaken approximately two years previously. Water pools at and around the washbay catch pit, extending south into the area delineated as the washbay, and is pumped to the slops treatment process at the end of each day. Similar defects were noted in the vicinity, including around nearby surface water drainage manhole MH1;
- Localised areas of damage to surfacing were also noted further south-west around and beyond the foul water gully south of MH3; and
- An area of presumed older concrete surfacing with frequent jointing and signs of wear was present around the south end of the S/S Shed, extending towards the powder area.

Drain surveys are undertaken every few years. The most recent report (Drainflow, dated 26th September 2022) identified several defects, including ingress of water into a pipe, but no obvious leaks. Defects were noted to be long-standing. The condition of sumps/ catch pits is unknown.

Utility/ service ducts within the ground at the site are potential preferential flow pathways. Several buried electric and internet lines are present on the site, mainly on the east of the site. One electric cable does run under the active yard area at the north of the OBMC tank bund but only for a short distance and is unlikely to be of significance. Where practically feasible, cables have been kept above ground for ease of maintenance *etc.*, *e.g.* within a cable tray mounted on the western boundary wall.

5.3 Receptors

The site is located in a commercial/ industrial area with no residential properties in proximity. Relevant potential human health receptors are, therefore, workers at the site and on neighbouring premises.

No topsoil or subsoil is known or anticipated to be present on the site. However, shallow granular made ground and superficial deposits of glacial till are recorded as present below concrete surfacing at the site. Some sorption and retardation of RHS is expected to occur within these deposits, which are considered a potential receptor. Unsurfaced/ vegetated ground is present adjacent to the west of the site and could be impacted by run-off, including a narrow area at the south of the OBMC bund where the ground drops to an off-site skip laydown area.

Groundwater is a potential receptor, with shallow groundwater in the natural superficial deposits most likely to be impacted and, therefore, considered the most relevant groundwater receptor for the site, although the bedrock aquifer is also a potential receptor.

Due to their distance and/or direction from the site, and the absence of run-off from the site, surface waters are not considered a relevant receptor for the site. The Buchan Ness to Collieston Coast Special Protection Area (SPA) is also excluded as a receptor on the basis of its distance from the site.

6 PROPOSED INTRUSIVE INVESTIGATION

6.1 Objectives

The principal objective of the site investigation is to:

- Provide an updated baseline of concentrations of pollutants (RHS) relevant to potential past or ongoing emissions under the permit.

The investigation does not, however, aim to provide a comprehensive survey of RHS presence at the site.

The investigation also aims to install boreholes for subsequent monitoring of groundwater (as required by PPC variation), the objectives of which are to:

- Demonstrate the site's compliance with the requirements of PPC 2012;
- Confirm the effectiveness of the pollution control measures in place; and
- Provide early warning of the presence of RHS within the soil environment for prompt corrective action.

6.2 Investigation Overview

Since the site is to continue as an active industrial premises, it is proposed to predominantly undertake the investigation by drilling of boreholes. Soil samples will be collected from each borehole.

6.3 Investigation Locations and Depths

Proposed investigation locations are shown on Figures 379860-GIS001 and 379860-GIS002 in Appendix A. The exact locations should be micrositied to minimise site disruption and avoid heavy traffic areas. This should include consideration of borehole retention and future access for monitoring.

The rationale for the new borehole locations is provided in Table 6-1 below. As with the 2014 site investigation, borehole designations will include the year to distinguish from the previous boreholes, e.g. "25BH1" if drilled in 2025.

Table 6-1: Rationale for Borehole Locations

Borehole	Rationale
BH1	In proximity to and expected to be downgradient of Slops Tank Farm and in vicinity of damaged ground surfacing.
BH2	In proximity to washbay area.
BH3	Within former drill cuttings process building and proximal to former bund location.
BH4	Within area of OBMC, slops and raw materials storage and handling. Proximal to poor condition/ damaged OBMC tank bund and ground surfacing. Potential upgradient location on site.
BH5	In proximity to OBMC handling area and underground feed lines.
BH6	Within area of poor ground surfacing.
BH7	In proximity to bund. Potential downgradient location on site.
BH8	In proximity to, and expected to be downgradient of, OBMC tank bund.
BH9	In proximity to current and former OBMC processing areas.

Borehole	Rationale
BH10	In proximity to diesel tank and maintenance workshop formerly containing special waste storage and intended to house RotoMill. Potential downgradient location on site.

Boreholes should be excavated and installed to bedrock (expected to be achieved at 5-10m bgl), unless obstructed, and to at least 1.0m below groundwater strike to allow sufficient water for sample collection from the superficial aquifer during monitoring events.

Boreholes will be installed with a lockable watertight flush-to-ground metal cover rated to BS124 and EN125. A raised metal cover may be used at locations in non-operational areas to facilitate borehole location. Wells will be equipped with a suitable standpipe and gas valve. It is anticipated that plain standpipe will be used for the top metre, with slotted pipe for the remainder. Borehole installations will be sealed with bentonite for at least 1.5m at the top of the installation and concreted at the surface.

The “as drilled” locations and elevations of boreholes will be established in relation to the National Grid and Ordnance Datum.

6.4 Soil Sampling

Samples will be collected from the arisings during borehole drilling. Depending on the method of drilling deployed, samples will be either disturbed or undisturbed.

Samples will be collected at approximately 0.3m (or immediately below the concrete if deeper), 1.0m, 2.0m, 3.0m and 5.0m bgl. At all boreholes, additional samples will be collected of any horizons showing visual or olfactory indications of contaminant presence.

If possible, additional soil samples will be collected from the vegetated strip at the south of the OBMC tank bund.

The guidelines in BS10175:2011+A2:2017 will be followed during recovery of samples for chemical analysis. All samples will be collected in new, clean laboratory-grade tubs and jars as appropriate, and each sample will be uniquely identified and a chain of custody system used throughout sample transfer.

Sampling equipment will be cleaned between samples to prevent cross-contamination.

Samples will be stored appropriately in cool boxes, with ice packs, maintaining a temperature below 4°C and transferred to a nominated chemical testing laboratory. Sample storage will not exceed the laboratory's specified holding times for each analysis.

6.5 Laboratory Analysis of Soils

Laboratory analysis of soils will be for the suite provided in Table 6-2. Samples will be selected for analysis based on the driller's logs.

Table 6-2: Relevant Hazardous Substances to be Analysed in Soil

Medium	Suite ⁶
Soil	Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Mercury (Hg), free cyanide, TPH CWG, total phenol, Ammoniacal Nitrogen, TOC, pH, SVOC, VOC, water-soluble sulphate, chloride

Dependent on the findings of the solid soil laboratory analysis, leachability analysis for metals/ metalloids may be undertaken on selected samples.

6.6 Borehole Monitoring and Groundwater Sampling

Groundwater levels will be recorded during monitoring of the boreholes, as will the presence and thickness of any LNAPL. If LNAPL is present and in sufficient thickness, it should be sampled. Groundwater and LNAPL sampling will be carried out in accordance with BS ISO 5667-11:2009.

The following water quality monitoring parameters will be recorded during purging/ sampling works:

- pH
- temperature
- dissolved oxygen
- redox potential
- electrical conductivity.

6.7 Laboratory Analysis of Groundwater

Laboratory analysis of groundwater will be for the suite provided in Table 6-3. Limits of detection (LODs) will be agreed with SEPA in advance.

Table 6-3: Relevant Hazardous Substances to be Analysed in Groundwater

Medium	Suite
Groundwater	COD, Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Mercury (Hg), free cyanide, TPH CWG, total phenol, Ammoniacal Nitrogen, TOC, pH, SVOC, VOC, sulphate, chloride

6.8 Reporting

The report shall contain:

- Field observations (e.g. weather, soil logs, groundwater levels);
- Field data;
- Laboratory results;
- Changes from the sampling/monitoring strategy;
- Interpretation;
- Actions.

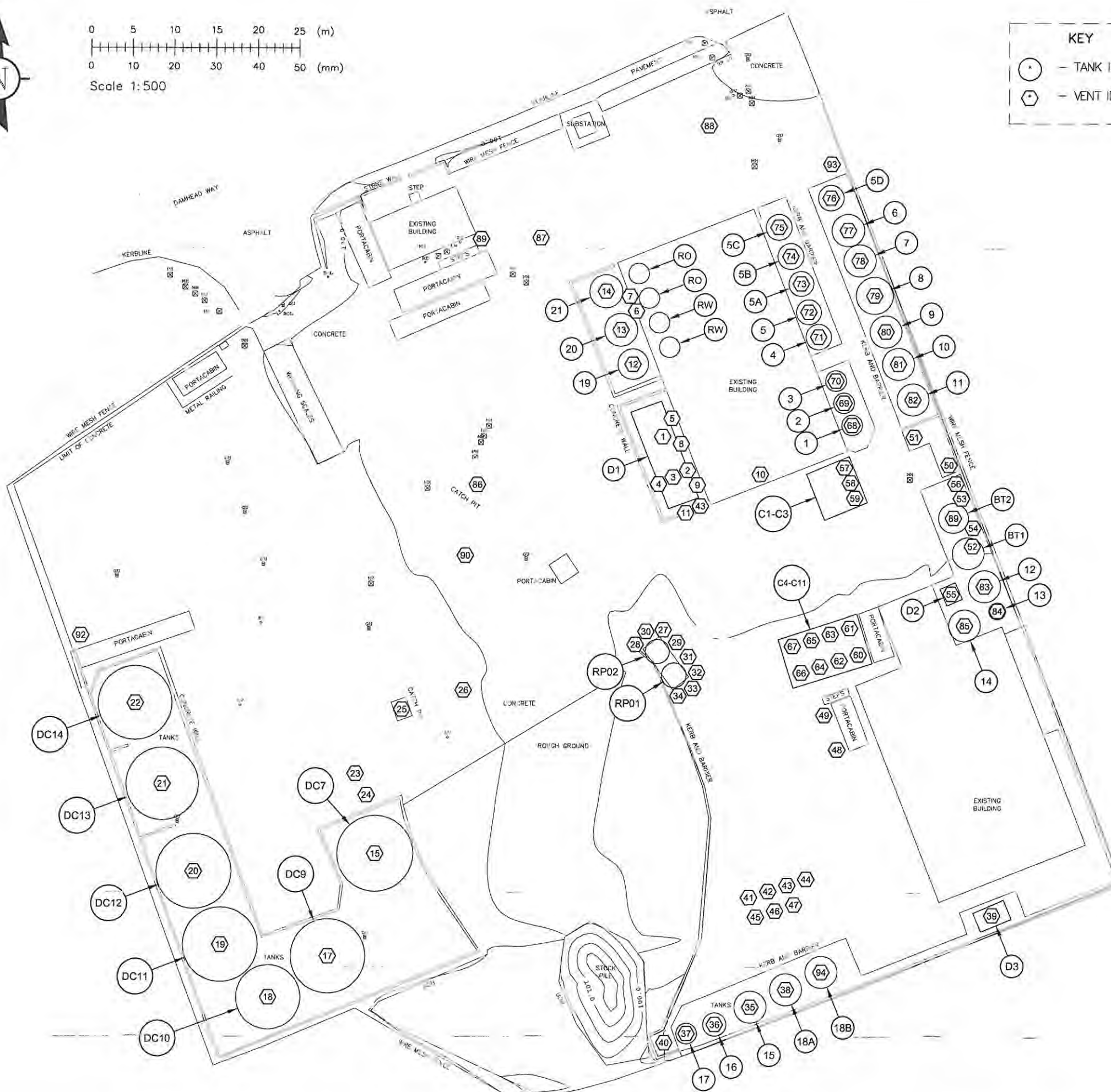
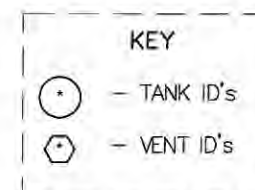
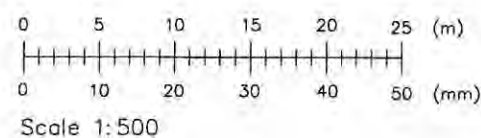
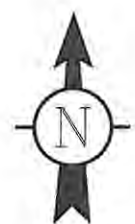
⁶ COD was included in Table 3.2 of VAR01 as a soil monitoring requirement. However, COD is typically analysed only in water samples and so is not included in the table.

Assessment of analytical data will be by reference to previous monitoring of soils and groundwater undertaken at the site and, where necessary for consideration of any pollution risks, by comparison with standard assessment criteria.

Interpretation of these assessments of the chemical data will be with reference to operations at the Permitted Installation, and details will be provided of corrective actions that are required to remedy any contamination that has occurred as a result of permitted activities.

APPENDICES

A FIGURES



DO NOT SCALE

COMPONENT NOTES

[illegible]

NOTES

- 1) THE INFORMATION PROVIDED IS TO BE USED AS A GUIDE ONLY.
- 2) VENT ID '91' IS A MOBILE UNIT AND HAS NOT BEEN REPRESENTED WITHIN THE DRAWING.
- 3) PLEASE READ THIS DRAWING IN CONJUNCTION WITH DOCUMENTS: PHD - REGISTER OF VENTS & PHD - TANK REGISTER



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REV.							

01	ISSUED FOR INFORMATION	31/03/10
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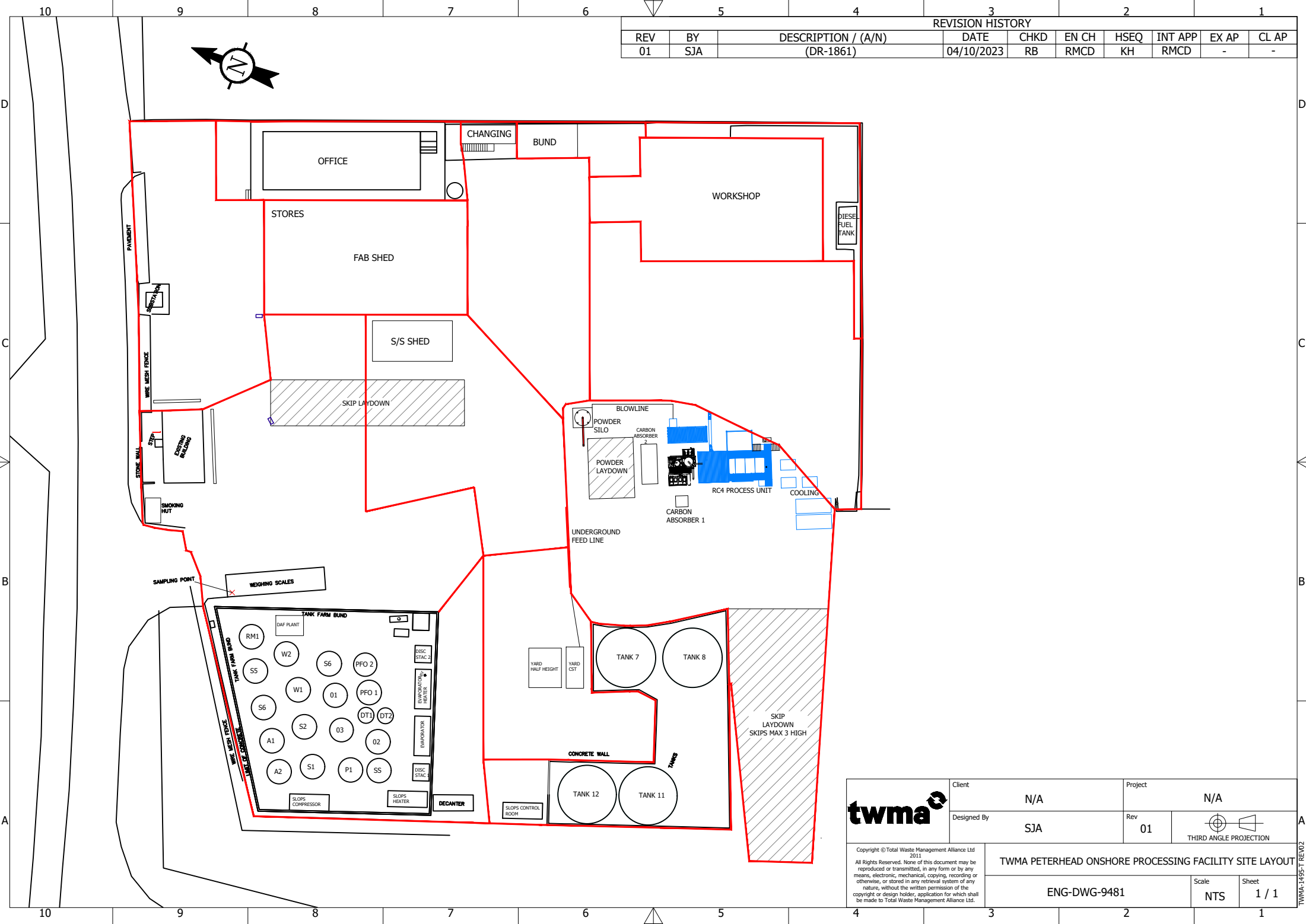
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PROJECT

TITLE	PETERHEAD SITE PROJECT ID: SITE LAYOUT
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DRAWING NUMBER PHD-LY-00-00-3108

REV.	01
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REVISION HISTORY											
REV	BY	DESCRIPTION / (A/N)			DATE	CHKD	EN CH	HSEQ	INT APP	EX AP	CL AP
01	SJA	(DR-1861)			04/10/2023	RB	RMCD	KH	RMCD	-	-

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	Designed By SJA		Rev 01	 THIRD ANGLE PROJECTION
	TWMA PETERHEAD ONSHORE PROCESSING FACILITY SITE LAYOUT ENG-DWG-9481			Scale NTS Sheet 1 / 1



Legend

- PPC boundary
- Washbay catch pit
- 2005 LDG-GSS boreholes (approx)
- 2006 SLR boreholes
- 2014 boreholes
- Proposed monitoring boreholes

Do not scale this map

Client
Igne

Project
TWMA Dales Industrial Estate, Peterhead

Title
Proposed Site Investigation Plan - relative to current site layout

Status
DRAFT FOR COMMENT

Drawing No.	Revision	Date
379860-GIS001	-	17 Feb 2025
Drawn	Checked	Approved
HA	FR	FR

Scale
1:500 @ A3

Rev	Date	Amendment	Initials
-	-	-	-

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Legend

- PPC boundary
- Washbay catch pit
- 2005 LDG-GSS boreholes (approx)
- 2006 SLR boreholes
- 2014 boreholes
- Proposed monitoring boreholes

Do not scale this map

Client

Igné

Project

TWMA Dales Industrial Estate, Peterhead

Title

Proposed Site Investigation Plan - relative to 2014 site layout

Status

DRAFT FOR COMMENT

Drawing No. 379860-GIS002	Revision -	Date 17 Feb 2025
Drawn HA	Checked FR	Approved FR

Scale

1:500 @ A3

Rev	Date	Amendment	Initials
-	-	-	-

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B RECORDED ENVIRONMENTAL INCIDENTS

The table below shows incidents extracted from TWMA's archive from 2014 to the present day which are identified as giving potential for pollution (those regarding noise and/or odour only have been excluded).

Incident No	Incident Date	Spilled Material	Description of Incident
55	12/08/2014	Oil	Spill in tank farm, tank overflowed, approximately 55 litres. Contained and cleaned
75	09/11/2014	Oil	Recovered oil from RD14 (Rotomill) spilled into containment bund. Hose leak
186	21/06/2016	Oil	Spilled from IBC in yard, onto concrete, less than 10 litres. No release to drain. Spill procedure followed, spill contained and cleared up.
216	16/12/2016	Recovered oil	Recovered oil spill from leaky connection in pipe work. Occurred between powder silo and Fairy Hillock
312	11/07/2018	Drill Cuttings	Drill cuttings spill from rotomill feed skid onto concrete beneath, around 14m ³ . No loss to drain, spill contained and recovered using vacuum tanker
368	29/03/2019	Diesel	10 litres spilled during refuelling, spill contained and cleaned
386	02/07/2019	Slops	Slops spill during transfer to filter box in tank farm. Spilled within and out with tank farm bund. Spill contained and cleaned. Foul drain isolated and interceptor emptied and cleaned as precaution.
393	16/07/2019	Oily Water	4 litres spilled within Tank farm bund during transfer of wastewater sludge from the DAF plant to skip bin
414	20/08/2019	Drill Cuttings	5 -10 litres out with containment. Spill was contained with the use of a vacuum pump
442	14/12/2019	Diesel	300 litres spilled during refuelling, onto concrete, no entry to site drainage
499	15/07/2021	Diesel	Diesel spill outside maintenance workshop
506	26/08/2021	Hydraulic Oil	200 litres of hydraulic oil leaked from faulty pump to concrete. Spill mats deployed, did not reach site drainage
526	04/02/2022	Recovered oil	Pump failed on oil box under disc stacks. The box over filled and deposited oil on floor. Contained the spill and cleaned up.